

ABSTRACT

A trench MOSFET transistor device and method of making the same are provided. The trench MOSFET transistor device comprises: (a) a drain region of first conductivity type; (b) a body region of a second conductivity type provided over the drain region, such that the drain region and the body region form a first junction; (c) a source region of the first conductivity type provided over the body region, such that the source region and the body region form a second junction; (d) source metal disposed on an upper surface of the source region; (e) a trench extending through the source region, through the body region and into the drain region; and (f) a gate region comprising (i) an insulating layer, which lines at least a portion of the trench and (ii) a conductive region, which is disposed within the trench adjacent the insulating layer. The body region in this device is separated from the source metal. Moreover, the doping profile within the body region and within at least a portion of the source and drain regions, when taken along a line normal to upper and lower surfaces of the device, is such that the doping profile on one side of a centerplane of the body region is symmetric with the doping profile on an opposite side of the centerplane.